SECTION 12 – FUEL SYSTEM

- The fuel system includes the fuel tank, the fuel pump and the necessary piping to carry the fuel from the tank to the carburetor or injection system.
- All motor fuel tanks attached to the vehicle fuel system must be secured and meet the standards as listed in (Federal Motor Vehicle Safety Standards) FMVSS 571-301.
- (National Fire Protection Association) NFPA Pamphlet 52 can be purchased from http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=52
- National Fire Protection Association Pamphlet 58 can be purchased from http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=58

A. DIESEL / GASOLINE

1. Check the fuel tank, fuel tank support straps, filler tube (rubber, plastic, metal), tube clamps, fuel tank vent hoses or tubes, filler housing drain, overflow tube and fuel filler cap.

    a. **REJECT** when:

        1) There is fuel leakage at any point or there are escaping gases detected in the system.

        2) The fuel tank filler cap is missing.

        3) Any part of the system is not securely fastened or supported.

        4) Has physical damage to any fuel system component.

        5) Crossover line is not protected and drops more than two (2) inches below fuel tanks.

B. LIQUID PROPANE GAS (NFPA-58)

1. Check the fuel tank, fuel tank support straps, filler tube (rubber, plastic, metal), tube clamps, fuel tank vent hoses or tubes, filler housing drain, overflow tube, fuel filler cap and conversion kit installations.

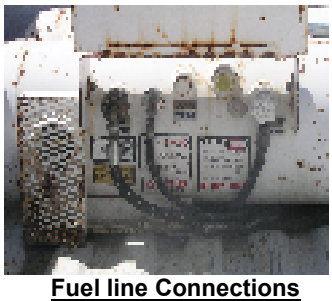
    a. **REJECT** when:

        1) There is fuel leakage at any point or there are escaping gases detected in the system.

***NOTE: The mere presence of a propane odor (Ethyl Mercaptan) does not necessarily mean that a leak exists. An inspection utilizing the soap test with antifreeze must be utilized. Leaks are commonly found in the vaporizer, fuel lines, or fuel line connections. (See examples on page 71).**

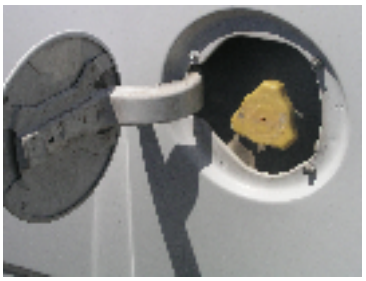
Fuel System – Continued


Vaporizer Sample


Fuel line Connections


Fuel Line Connections

2) The fuel tank filler cap is missing. (This is the cap over the fueling receptacle, not the door to the receptacle). **(See examples below).**


Fuel tank filler cap in fuel door


Fuel tank filler cap missing


Fuel tank filler cap on tank

3) Any part of the system is not securely fastened, supported or the tank valve is not shielded.

***NOTE: Fuel containers shall be installed to prevent their jarring loose, and slipping or rotating. The piping system shall be designed, installed, supported, and secured in such a manner as to minimize damage due to expansion, contraction, vibration, strains and wear. Container valves, appurtenances, and connections shall be protected to prevent damage due to accidental contacts with stationary objects or from stones, mud, or ice and from damage due to an overturn or similar vehicular accident. This must be done by locating the container so that parts of the vehicle furnish the necessary protection, or by the use of a fitting guard furnished by the manufacturer of the container, or by other means to provide equivalent protection.**

(See bracket and valve protection examples below)


Tank Bracket


Tank Bracket


Tank Bracket

Fuel System - Continued

Container valve protection over a liquid injector system

Container Valve, Appurtenances & Connections Protection

Container Valve, Appurtenances & Connections Protection

4) Has physical damage to any fuel system component.

***NOTE: Containers cannot have excessive denting, bulging, gouging, or corrosion and the fuel lines cannot have any corrosion. Welding is only permitted on saddle plates, lugs, pads or brackets that are attached to the container by the container manufacturer. Some surface rust on the tank is permitted, so long as the tank paint coating is in good condition to prevent corrosion. (See examples below).**

Propane tank with corrosion

Propane tank with good paint

Propane tank with *corrosion*

5) There is any installation hazard present which may cause a potential hazard during a collision.

***NOTE: Containers shall be located to minimize the possibility of damage to the container and its fittings. They shall not be mounted directly on roofs or ahead of the front axle or beyond the rear bumper of a vehicle. No part of a container or its appurtenances shall protrude beyond the sides or top of the vehicle. Containers located less than 18 inches from the exhaust system, the transmission, or a heat-producing component of the internal combustion engine shall be shielded by a vehicle frame member or by a noncombustible baffle with an air space on both sides of the frame member or baffle. For tanks that are installed inside a passenger compartment, they shall be installed in an enclosure that is securely mounted to the vehicle, such as a trunk which is gastight with respect to the passenger compartment and is vented to the outside of the vehicle. Manual shutoff valves shall be designed to provide positive closure under service conditions and shall be equipped with an internal excess-flow check valve designed to close automatically at the rated flows of vapor. The manual shutoff valve when put in the closed position shall stop all flow to and from the container and should be readily accessible without the use of tools, or other equipment. A check valve will not meet this requirement.**

Fuel System - Continued

6) Vehicle does not have a weather-resistant, diamond shaped label located on the right rear of the vehicle, identifying the vehicle as 'PROPANE' fueled vehicle.

Diamond shaped 'PROPANE' label on rear of vehicle.

Black/White Diamond shaped 'PROPANE' label

7) A propane fuel tank does not have a data plate (saddle plate) present or is not legible. Any aftermarket data plates welded on the tank are not permitted.

***NOTE: ASME (American Society of Mechanical Engineers) containers are installed permanently to vehicles and are not subject to the DOT inspection requirements. The container should be visually inspected each time it is filled. All containers fabricated to earlier editions of regulations, rules, or codes listed in NFPA 5.2.1.1 and of the Interstate Commerce Commission (ICC) Rules for Construction of Unified Pressure Vessels, prior to April 1, 1967, shall be permitted to continue to be used in accordance with Section 1.4. Containers that have been involved in a fire and show no distortion shall be re-qualified by a manufacturer of that type of cylinder or by a repair facility approved by DOT, before being used or reinstalled. Welding is only permitted on saddle plates, lugs, pads or brackets that are attached to the container by the container manufacturer.**

Corroded & Unreadable fuel tank data plate

Legible fuel tank data plate

Fuel System - Continued

C. NATURAL GAS (NFPA-52)

1. Check the fuel tank, fuel tank support straps, filler tube (rubber, plastic, metal), tube clamps, fuel tank vent hoses or tubes, filler housing drain, overflow tube, fuel filler cap and conversion kit installations.

   a. **REJECT** when:

      1) There is fuel leakage at any point or escaping gases are detected in the system (Odor will be present).

      2) The fuel tank filler cap / cover is missing.

      3) Any part of the system is not securely fastened, supported or shielded to prevent damage from road hazards, slippage, loosening or rotations. (NFPA 52, 6.3)

***NOTE: Make sure that the fuel tank is not exposed or unprotected. Tanks that are installed under a vehicle may not be mounted ahead of the front axle or behind the point of attachment of the rear bumper. Tanks shall be protected from physical damage using the vehicle structure, valve protectors or a suitable plastic or metal shield. A tank that is installed in the bed of a truck must be protected with a shield over the top and down any exposed sides. Shields shall be installed in a manner that prevents direct contact between the shield and the fuel tank. The shield shall also prevent the trapping of solid materials or liquids between the shield and tank that could damage the container or its coating. (NFPA 52, 6.3).**

(See shield examples below)

Metal Protective Shield Sample

Plastic Protective Shield Sample

Fuel System - Continued

4) There is any physical damage to a fuel system component.

5) There is any installation hazard present which may cause a potential hazard during a collision.

***NOTE: Fuel tanks shall be permitted to be located within, below, or above the driver or passenger compartment, provided all connections to the container(s) are external to, or sealed and vented from, these compartments. All tanks that are installed in the passenger compartment shall be vented to the outside of the vehicle with a boot or heavy plastic bag and shall not exit into a wheel well. Every tank and fuel line shall be mounted and braced away from the exhaust system and supported to minimize vibration and to protect against damage, corrosion, or breakage. No part of the fuel tank or its appurtenances shall protrude beyond the sides or top of any vehicle where the tanks can be struck or punctured. (NFPA 52, 6.3). (See vent examples below).**

Plastic Bag Vent Sample

Plastic Bag Vent Sample

6) Vehicle is not labeled in accordance with National Fire Protection Association Pamphlet 52.

NOTE: Each CNG vehicle shall be identified with a weather-resistant, diamond-shaped label located on an exterior vertical surface or near-vertical surface on the lower right rear of the vehicle (e.g., on the trunk lid of a vehicle so equipped, but not on the bumper of any vehicle) inboard from any other markings. The label shall be a minimum of 4.72 inches long by 3.27 inches high. Where a manual valve is used the valve location shall be accessible and indicated with the words "MANUAL SHUTOFF VALVE". (NFPA 52, 6.11.1).

(See CNG exterior and manual shutoff example labels on page 76)

Fuel System - Continued

CNG manual shut-off label sample

CNG exterior label sample

NOTE: **A vehicle equipped with a CNG fuel system shall bear a label readily visible and located in the engine compartment with identification as a CNG-fueled vehicle, system service pressure, installer's name or company, container retest date(s) or expiration date and the total container water volume in gallons. There shall also be a label located at the fueling connection receptacle with identification as a CNG-fueled vehicle, system working pressure and container retest date(s) or expiration date. If both labels are located in one of the above areas, the labels shall be permitted to be combined into a single label. (NFPA 52, 6.11)**

Engine Compartment Label Sample

Fueling Receptacle Sample

Fuel System – Continued

6) A CNG fuel container is not current on its certification in accordance with FMVSS 304.

NOTE: Each CNG fuel container shall be permanently labeled and visually inspected after a motor vehicle accident or fire and at least every 36 months or 36,000 miles, whichever comes first, for damage and deterioration. (S7.4, FMVSS 304). Disassembly of the tanks protective shield is not required to verify the label on the tank, if a current CNG Inspection Form that identifies the vehicle make, model, tank certification number and Vehicle Identification Number is provided at the time of the safety inspection.

NOTE: To locate a CNG certified inspector for a tank certification, refer vehicle owner to: http://peoplesearch.csa-america.org/

CNG tank certification label sample

***NOTE: LPG and LNG leaks may accumulate at ground level. Use extreme caution when around these systems. At no time shall an inspector attempt to conduct maintenance or alterations to any alternative fuel system, unless that inspector is currently certified and trained in alternative fuel conversion installations. Working around these systems is extremely dangerous and requires extensive training.**